

Fish Passage Decision Framework for BC Hydro Facilities

Revision 2 – September 2018

Note: this document was originally created in 2008 and signed off and endorsed by Fish, Wildlife and Hydro Policy Committee representatives. In 2016, additional information was added to the document and reviewed and endorsed by the Fish, Wildlife and Hydro Policy Committee representatives in January 2017 (Revision #1). In 2018, Step 6 and 7 were updated to more accurately describe BC Hydro's capital planning process. This addition was reviewed and endorsed by the Fish, Wildlife and Hydro Policy Committee representatives in September 2018 (Revision #2).

Purpose - To establish a process which will determine how BC Hydro will address fish passage issues at BC Hydro facilities. This document also clarifies the role of the Fish & Wildlife Compensation Program (FWCP) in supporting the development of fish passage proposals for BC Hydro consideration.

Background and Scope - The development of some of the BC Hydro dams in certain watersheds resulted in a blockage to migratory fish. The result often meant the elimination or the reduction of specific migratory fish species or populations in the rivers. Proposals for fish passage have been initiated by public and First Nation groups, with Fisheries Agencies support, at several BC Hydro facilities. The rationale for fish passage is to improve the productivity of affected watersheds through the re-establishment of selected species of fish to the portions of the watershed they historically utilized. This Framework was endorsed by the FWCP in 2008 for application to facilities where fish passage was identified as a priority at respective facility watersheds.

BC Hydro Commitment to the Environment – BC Hydro's Environment Strategy and Principles establish our commitment to environmental protection while providing reliable, affordable, clean energy to our customers. The Fish Passage Decision Framework will help ensure that fish passage decisions are based on a structured decision making approach, with sound defensible criteria.

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The construction of several of BC Hydro hydro-electric facilities resulted in a barrier to fish that previously utilized areas of the watershed above and below the dam. Fish passage is required to re-establish selected species of fish to portions of the watershed that they historically utilized. There have been several fish passage proposals that promote the construction of fish ladders or other permanent fish passage facilities at hydro-electric facilities.

The Fish & Wildlife Compensation Program (Coastal, Peace and Columbia) was established by BC Hydro in partnership with the Department of Fisheries and Oceans (DFO) and the Province as a mechanism to help address footprint impacts. Each region is managed by a separate Board made up of members from the public, First Nations, DFO, the province and BC Hydro. The Policy Committee made up of senior managers from BC Hydro, the province and DFO sets the overall policy direction for the FWCP including the governance structure, establishes the strategic framework, oversees periodic FWCP evaluations, approves significant changes to the FWCP, and addresses disputes arising from within the FWCP when necessary (FWCP Governance Manual 2014). The FWCP was established to compensate for impacts to fish, wildlife and their supporting habitat resulting from the construction of BC Hydro dams (footprint impacts). Whereas impacts caused by facility operations (e.g. water level changes and maintenance) are addressed through other programs such as Water Use Plans, the Fish Entrainment Strategy, and fish stranding protocols.

While the blockage of fish passage is defined as a footprint impact, there is insufficient funding in the FWCP to take on the funding of construction projects (e.g. fish passage infrastructure). As a result, the Policy Committee has endorsed a formalized approach to involve the FWCP Boards in the decision making process of analyzing the issue and to ultimately make decisions to address the technical feasibility and likelihood of success of fish passage. The Fish Passage Decision Framework (“the Framework”) is divided into two parts:

- The FWCP role: a Proponent-led process whereby the proponent (typically a fish passage committee) seeks funding from the FWCP to evaluate the feasibility of restoring target species above respective BC Hydro facilities through the installation of some form of fish passage infrastructure. This part of the Framework is completed when a proposal is found to be “infeasible” or if the regional FWCP Board endorses the fish passage proposal; and
- The BC Hydro role: Once the regional FWCP Board endorses the fish passage proposal (“Step 5” of the Framework), the Proponent will submit a supported project proposal for fish passage which will then go to BC Hydro for business case and financial approval.

Currently, FWCP Coastal region is the only chapter to consider fish passage initiatives within its Action Plans. If other chapters identify and approve fish passage as a key priority in their watershed Action Plans, the Framework would apply accordingly.

FWCP Role:

The applicable FWCP Board needs to be convinced that the fish passage proponent has met the requirements of each step in the Framework before it endorses a fish passage plan. The FWCP Board can, at any time, utilize the regional FWCP Technical Review Committee within the FWCP proposal review process or an independent consultant (e.g. a fish passage expert) to inform its decisions. In addition, BC Hydro will provide a technical lead to support the proponent, and act as a liaison with the FWCP Board to ensure consistency and support communication between the FWCP Board and the proponent.

Although the Framework is intended to be implemented in as a linear process, studies and

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activities under Steps 3 and 4 may be implemented in order of priority or complexity in the process, as informed by the target species requirements and the facility context.

Step 1 - Preliminary Screening

To determine whether a fish passage proposal for a specific watershed addresses a footprint impact, the following screening question will be asked:

“Did the facility block passage of a migratory fish stock at the time of construction?”

Each of the FWCP regions has developed Watershed Action Plans in partnership with the FWCP Board, Technical Committees, BC Hydro, First Nations, DFO, the province, and other stakeholders through a series of consensus building workshops. The planning process establishes priority conservation, enhancement and restoration opportunities for each watershed.

Fish passage opportunities are prioritized within the Watershed Action Planning process. Within-watershed priorities are based on Provincial and Federal agency species objectives and on preliminary biological and technical feasibility criteria, including whether the facility blocked passage at time of construction. High priority opportunities are integrated into watershed or species specific Action Plans. If fish passage has not been identified as a priority in the Action Plan or by the FWCP Board, it would need further evaluation before the proponent could proceed to Step 2.

Step 2 –First Nations and Stakeholder Engagement

Fish Passage Decision Framework studies and activities outlined in Steps 3 and 4 below are funded through the normal FWCP application process, which requires that proponents demonstrate their applications have the support of regional First Nations, stakeholders and regulatory groups. To ensure that the proponent considers affected interests, it is highly recommended that a fish passage committee be established that includes representatives from local First Nations, community and regulatory groups, and BC Hydro. It is recommended that all participants carry the mandate to represent their interests and the authority to participate in fish passage committee decisions. The fish passage committee should document its fish passage plan objectives, including expected restoration goals, expectations of ongoing support, and consistencies with fish passage committee representative objectives (regulatory requirements, BC Hydro operating requirements, etc.). Based on the objectives, the fish passage committee can then identify its data gaps in developing a fish passage plan that will address Steps 3 and 4 below. The fish passage committee should establish a timeline for addressing its critical gaps, with those uncertainties deemed of most significance to plan success addressed earliest in the timeline. Changes to the plans based on inputs from studies or other sources should also be communicated and reviewed as needed.

Step 3 - Environmental Feasibility Studies

In order to assess the potential for success for a fish passage proposal, initial environmental feasibility studies must be undertaken. Environmental feasibility studies are undertaken to determine whether fish passage plan objectives described by the fish passage committee can be met given biologic inputs collected in the Framework. The environmental feasibility of each fish passage proposal must include the following assessments:

- Target species are available in the watershed in sufficient numbers to support rebuilding a sustainable population. If the target species is not available and a donor stock transplant is proposed, a thorough risk assessment related to suitability of the donor stock and impact on the donor stock must be undertaken;

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- Potential genetic, ecological and disease impacts to native species;
- Existence of high quality spawning and rearing habitat below the dam;
- Other physical impediments, such as other adult migration barriers below the dam, or juvenile passage issues at the facility, or different flow regimes that may limit the potential for restoration goals to be achieved;
- Sufficient spawning and rearing habitat above the barrier to support the target fish population numbers established in the Watershed Action Plan, or the known potential to restore sufficient habitat. Feasibility studies must be undertaken to assess this potential; and
- An assessment of the biologic benefits of a fish passage plan, as well as a summary of the risks of biologic impact and regulatory requirements.

Assessments may be based on available literature, modeling, or direct empirical measurement as dictated by the complexity and understanding of the issue. In evaluating an assessment proposal, the FWCP Board will determine if:

- (a) an appropriate review of options has been conducted;
- (b) the assessment is required to determine feasibility; and
- (c) whether the approach has a reasonable chance of addressing the uncertainty.

Depending on the number and complexity of data gaps, this step can take several years to complete. Multi-year study plans will be considered where the criteria above have been accounted for and the proposal represents a priority for funding. Some studies used to establish biological feasibility may require approval from the province or DFO.

Environmental feasibility is established where the fish passage committee and the FWCP Board agree that studies and activities demonstrate that fish passage plan objectives can be sustained under the appropriate technical circumstances. The proponent may request a meeting with the FWCP Board to determine whether Step 3 requirements have been met.

If environmental feasibility has not been adequately demonstrated, or any of the fish passage committee feels that their objective are not adequately considered in the process, the FWCP Board may direct proponents to re-submit to address their concerns, or deny their application.

Step 4 – Preliminary Technical Feasibility Consideration

The proponent is responsible for identifying the fish passage solution(s) that will be technically feasible to address requirements to meet its stated restoration goals. This includes a review of fish passage option(s), an analysis of fish passage efficiencies and effectiveness (e.g. survival), a description of operational requirements, high-level design and an estimate of construction and fish passage operation costs. BC Hydro engineering will provide in-kind support to the proponent in its review and selection of fish passage option(s), to ensure that dam safety, operating requirements, maintenance standards and crew requirements are considered in the final recommendation. The proponent needs to ensure that it responds to any concerns BC Hydro raises in its review.

The review and analysis of option(s) can be based on case studies of technologies applied successfully in similar contexts, or may require more specific evaluation in lieu of relevant examples from the literature. The technical assessment will include a high-level design and the construction and operational costs of the recommended option.

Technical feasibility is established once the fish passage committee and the FWCP Board agree that the plan can support its biologic objectives using technologies and operations that

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are proven within the specific facility context. The proponent may request a meeting with the FWCP Board to determine whether Step 4 requirements have been met.

If technical feasibility has not been adequately demonstrated, the FWCP Board may direct proponents to submit applications that will address identified gaps, or deny their application.

Step 5 – FWCP Endorsement

After completing Steps 3 and 4, the proponent will prepare a fish passage plan and seek technical support with DFO and the province. The proponent will then present the fish passage plan to the FWCP Board for its endorsement to proceed to Step 6. The summary and presentation will be reviewed by the FWCP Board utilizing any additional technical resources dictated by the complexity of the fish passage plan and the understanding of FWCP Board members.

In addition to demonstrating technical and environmental feasibility, the FWCP Board and proponent must ensure that the information provided in the fish passage plan will adequately inform the development of a business case in Step 6:

- What are the risks associated with the fish passage plan:
 - likelihood of success?
 - Regulatory approvals?
 - Demonstrated success of the proposed technologies?
 - Population, genetic or ecosystem threats?
 - Impacts to facility operation?
- What are the costs of the fish passage plan: operations, study costs, construction?
- What are the benefits: biologic (productivity), conservation, First Nations cultural and other societal benefits (tourism, education)?

The FWCP Board is not responsible for conducting the business case evaluation, but will ensure the proponent has provided the values in a meaningful summary to inform the next step in the Framework. Once the FWCP Board is satisfied the proponent has met the requirement in these 5 steps, it will endorse the fish passage plan for BC Hydro consideration.

Where the proponent has NOT met the Framework requirements to this point, the FWCP Board will provide feedback (according to its technical review or directly from the FWCP Board) to the proponent for further work. If the proponent's fish passage plan is deemed NOT feasible based on the weight of evidence provided, the FWCP Board must indicate that it cannot be endorsed and that future requests to support the its evaluation will not be funded.

BC Hydro Role:

Step 6 – Business Case Executive Summary Development and Capital Plan Submission

BC Hydro will develop a business case executive summary for consideration in BC Hydro's long-term capital plan. The business case will assess alternatives for fish passage using a structured approach that explicitly integrates environmental, social, and financial objectives under the Identification Phase of a capital project. The business case should include the following:

- (a) **Project Objectives:** summary in general terms of environmental, social and business goals for the project.

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- (b) Risk Assessment:** rationale for the inclusion of a fish passage project into BC Hydro's capital plan, the environmental, regulatory and reputational risks will be quantified with respect to both the proposed fish passage approach and its timing.
- (c) Environmental Assessment:** assessment of the environmental benefits and feasibility of fish passage in consideration of the fish passage objectives and potential alternatives.
- (d) Financial/Technical Assessment:** analysis of fish passage technical feasibility for the proposed watershed.
 - BC Hydro engineering will review options for upstream and downstream passage facilities, and/or facility modifications to evaluate technical feasibility and compatibility with BC Hydro operations requirements and facility asset plans. Any option that is not compatible with facility requirements may be deferred to alternative processes (e.g. Water Use Planning Order Review, facility asset reviews, etc.)

Costs of each option will be summarized in terms of capital costs, maintenance and operating costs, monitoring and any risk mitigation contingency costs.

- (e) Social Benefits Assessment** – assessment of added societal value. Considerations may include:

- Intrinsic values – there is demonstrated evidence that the intrinsic value of the watershed will be positively impacted by the proposal (i.e. improved ecosystem biodiversity);
- Cultural – First Nation have identified the importance of returning fish providing food, social, ceremonial and spiritual values; and
- Socio-economic – there is demonstrated evidence that there will be an increase in tourism, recreation, jobs and / or a new or enhanced fishery.

The business case will recommend a course of action with costs and risks associated with the preferred option. The executive summary will include a plan for resolving uncertainties identified in the executive summary, to support project identification and definition phases. If submission to the capital plan is deferred for any reason, the business case may be re-evaluated.

Step 7 – Capital Plan Approval and Project Initiation

The business case executive summary will be evaluated with respect to BC Hydro's economic and business practices to determine whether it fits into BC Hydro's long-term capital plan.

If accepted into the capital plan, BC Hydro will prepare a project plan for approval to initiate the project. Once initiated, the project will progress through the capital project phases: Identification, Definition, and Implementation. Review and approval by BC Hydro will follow normal project governance procedure and policies for each sequential phase. If a phase of the project is not approved, the approach and business case for that phase will be re-evaluated and re-submitted for approval. BC Hydro will seek regulatory agency review and approval as required. Once implemented, BC Hydro will be responsible for ongoing operation and maintenance of the passage facility.

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Figure 2 BC Hydro's Fish Passage Decision Framework

